Food regulation and trade under the WTO: ten years in perspective

David Orden* and Donna Roberts**

Abstract

This article reviews the performance of the World Trade Organization in the oversight of national regulatory decisions affecting agricultural and food trade. A picture emerges of modest international disciplines on the regulatory decisions of sovereign nations and the need for ongoing improvements. A road map to regulations is presented and empirical assessments of the effects of technical regulation on trade are reviewed. Conflicts over sanitary and phytosanitary barriers raised in the relevant World Trade Organization committee are summarized and formal dispute settlement cases involving technical trade barriers are evaluated. Drawing on these reviews, suggestions are made for improving international food regulation.

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1. Introduction

Just over 10 years ago, the World Trade Organization (WTO) strengthened international rules designed to discipline the regulatory measures that countries adopt to achieve legitimate agricultural and food safety and quality goals. In the case of sanitary and phytosanitary (SPS) measures, the disciplines require a scientific risk assessment and that measures be formulated to achieve their technical objective in a least trade-distorting manner. In the case of quality goals, the agreement on technical barriers to trade (TBT) again requires that measures be appropriate to the objective and least trade distorting. The new disciplines were backed up by a more binding dispute settlement process.

How well these new multilateral agreements have worked is important for several reasons. First, when sovereign countries adopt regulations to address health, safety, and quality goals, they often fail to take into account the international implications of imposing a measure. International accountability is a major goal of the SPS and TBT agreements. Second, the international agreements impose administrative costs on poor countries. In exchange, poor countries ought to benefit from the agreements by gaining market access that enhances their ability to participate in world trade. Third, agricultural trade is growing fastest in high-value products. These are products for which technical standards and regulations are prevalent. Fourth, acceptable standards for agriculture and food are evolving worldwide under various forces. New challenges thus arise for the multilateral agreements as a framework in which national rules are embedded.

This article provides a review in broad terms of the performance of the WTO in the international oversight of national regulatory decisions affecting agricultural and food trade since its launch in 1995. What emerges is a picture of modest international disciplines on the regulatory decisions of sovereign nations and the need for ongoing improvements.

National food markets are highly integrated through global trade and investment, yet nations retain the principal authority over almost all dimensions of their food regulation and standards. Increasingly, private-sector–promulgated standards, together with private supply chains of international scope, are determining food market access (see Henson, 2006, for a review). But optimal management of national food supplies

* *Department of Agricultural and Applied Economics, Virginia Polytechnic Institute and State University, Blacksburg, Virginia, USA and Markets, Trade and Institutions Division, International Food Policy Research Institute (IFPRI), Washington D.C., USA.*

** *Economic Research Service, USDA, 1800 M Street NW, Washington, DC, 20036-5831 USA.*

involves various forms of government intervention. Without exception, governments regulate their food sectors.

The justifications for regulatory coordination among countries and international oversight of national regulation stem from both the public goods aspects of disease and pest control and the opportunities to reduce market transactions costs for firms and consumers. By striving for more coherent decision making among themselves, countries can influence the conditions under which international trade is conducted and thereby address trade-related risks, improve product information, and foster welfare-enhancing transactions.

These justifications for effective coordination and disciplines internationally do not prevent controversy and conflict over regulations in the global food system. Regulation is often the subject of international disputes because national institutions are subject to domestic political pressures. It is easy even for countries with similarity of income levels and other characteristics to deviate in their regulatory decisions.

Appraisal of the net benefits of trade against any costs that arise from risks or market information failures linked to an open food system is a useful counterweight to the pressures for trade-related regulation, but is itself a difficult task. Such an appraisal entails an analysis of the expected benefits and costs of regulatory measures that includes a gains-from-trade calculation. Underprotection—that is, when too much trade is allowed by the regulations and standards in place or by their inadequate enforcement—is likely to be a problem at times. But overprotection—when relaxation of regulation would yield net welfare gains—is also evident in the food system.

Overall, two broad challenges are faced to improve existing food regulation. The first is to achieve the appropriate balance within countries between reliance on domestically determined and internationally agreed-on product specifications. Common risk-reducing measures can facilitate trade in low-cost, safe products, and the benefits of trade can be enhanced by lowering transaction costs through international harmonization. Conversely, adoption of the appropriate risk-reduction measures may depend on countries' specific circumstances, making harmonization inappropriate. Undue harmonization might also impose limits on consumer choice. Finding the right degree of international coordination is the dilemma.

The second broad challenge facing food regulation is to maintain both the confidence of consumers and the cooperation of producers in implementing regulations and standards, while avoiding political-economy regulatory capture by either group. The resolution of this dilemma is found in improving national regulatory capacities and developing the competence and authority of international institutions to define and enforce disciplines on national regulators, despite the known limitations of regulatory processes and institutions at even the national level.

2. A road map of food regulation

Food regulations can be classified as either risk reducing or related to nonrisk product quality. The measures used can also be categorized by whether they focus on content or process attributes of products and by their breadth, scope, and instrumentation.[1] The requirements for verifying compliance or equivalence with a measure are also important in assessments of food regulations. These classificatory variables allow some generalizations to be made about the appropriateness of regulations in achieving their objectives.

One argument that emerges in our judgment is that regulations are most often the appropriate instrument for risk-related goals. By contrast, measures undertaken voluntarily by the private sector—albeit with varying and sometimes significant degrees of government involvement, including prosecution of deceptive claims—are the preferred approach for food quality goals. This argument is not to deny that risk-related regulations are sometimes distorted for protectionist purposes, nor to reject the claim that market failures occur in the provision of product quality information. The former warrants international disciplines and the latter some degree of government intervention. Yet the global food system is best served when regulations are used predominantly for risk reduction and sparingly to govern food quality. The governance of food quality is more diffuse than that for risk because a greater proportion of food quality measures are both established and enforced by the private sector. It is the market, rather than the government, that is likely to be the more agile

[1] For elaboration on this and other ideas presented in this article see *Food Regulation and Trade: Toward a Safe and Open Global System* (Sasling et al., 2004).

institution for accommodating a wide range of continually evolving consumer preferences.

The importance in the modern global food supply of private sector standards and tightly controlled marketing chains reflects this reality. Nonetheless, some of the most serious tests facing the global food system arise from emerging national regulation about quality issues. Increased consumer demand for quality-related product differentiation is a positive, income-driven phenomenon, attainable at declining cost as information technology advances. Acting on this demand, interest groups that feel strongly about specific food attributes have an incentive to seek greater government regulation of product quality. In international discussions, some governments have argued that increased regulation reflects a new era in the food sector in which policy makers must be attuned to the demands of consumers as well as producer advocates. But the new focus on consumer-driven quality regulations can lead to regulatory overprotection. Producer groups also favor stronger regulations on quality in those instances in which they gain market advantage. This situation can also lead to overprotection and distort trade.

Regulatory measures that address risk in agricultural production and food consumption underpin the structure of market transactions within countries and influence competitive advantage among trade partners. For animal and plant pests and diseases, the basic standards for controls are often broadly accepted internationally. The costs of new infestations or epidemics can be high, such as when foot-and-mouth disease (FMD) breaks out in a country previously considered FMD-free. New zoonotic diseases, such as BSE (likely related to modern agricultural production practices) or deadly avian influenza (protection from which may require modern practices) also bear high costs. Given these costs, international borders sometimes become a convenient surrogate for risk differentiation, leading to inappropriate regulatory discrimination among products by country of origin. WTO rules disciplining SPS barriers to trade, together with dissemination of relevant scientific research by the multilateral standards organizations—L'Office International des Epizooties (OIE), the International Plant Protection Convention (IPPC), and the Codex Alimentarius Commission (CODEX)—are therefore critical to sustaining an open global food system.

The regulation of food safety (including zoonotic diseases) poses challenges for somewhat different reasons than the pests and diseases affecting only animals and plants. Risk perceptions can affect estimates of the benefits of food regulation, which authorities weigh against the costs to industry of reducing food-borne hazards. It has long been recognized that unnatural and unfamiliar risks such as those that might be associated with new food production technologies are more alarming to consumers than natural and familiar risks. Even when a natural contaminant is identified as the source of food-borne illness, broad consumer avoidance of the implicated product can trigger a dramatic fall in consumption out of proportion to the actual risk involved. Thus the global food system has much to gain from well-designed and rigorously enforced food safety regulations that target hazards to consumer health and maintain confidence in the food supply. Under the right conditions, consumers trust their regulatory institutions to ensure their food safety and to respond rapidly to any breakdown in risk management. Problems occur when such trust is lacking, and both domestic and foreign suppliers, as well as consumers, suffer from the ensuing loss of confidence.

The governance of food safety regulation from a global perspective is also challenging because demands for protection among countries from food-borne hazards depend on income differences and other determinants of consumers' risk aversion. Likewise, the capacity to regulate effectively varies with levels of national income and development. Poorer countries will typically have less comprehensive programs in place for the assurance of food safety. The export of high-value and processed foods from some developing countries suggests that consumers in developed countries are prepared to trust imported food if it meets the standards set in their domestic markets. But it follows that the impact on developing-country exports can be severe if those countries are unable to meet high standards. An evaluative literature has emerged on these issues and public capacity strengthening projects and private investments aimed at meeting food and agricultural standards have proliferated in developing countries over the past decade.

Food safety regulations that address the use of production-enhancing technologies, including pesticides and other agrochemicals, hormones, veterinary drugs, and product-enhancing food additives, remain

controversial. For these technologies, the scientific basis for the regulation may itself be unknown or in dispute. Just as often, disputes arise when differences in public perceptions of risk persist among countries despite scientific consensus, or when countries have made different political choices about the desirability of adopting new technologies for reasons unrelated to safety. When strong differences in public perceptions are in play, or when risk-related and other goals become intertwined, international conflicts over regulations are often exacerbated. The duration and intensity of the long-unresolved beef hormones dispute between the United States and the European Union, for example, seem out of proportion to the economic stakes. But the highly politicized interests on both sides have allowed little room for the respective governments to find a satisfactory resolution.

The reform of food safety regulation, particularly in the wealthy countries, has placed emphasis on process standards, including those of Hazard Analysis and Critical Control Point (HACCP) programs, to achieve desired content attributes. Process standards are more difficult to implement internationally than product standards because they involve complex verification and enforcement procedures by private firms or regulatory institutions in two or more countries. Trade problems can arise from lack of trust in the regulatory processes across borders, inadequate public-sector enforcement capacity in some countries, and differences in accountability imposed on domestic and foreign products. Firms in developing countries are likely to have difficulty meeting food regulatory and traceability requirements imposed by the process standards of developed countries. Yet disagreements over process standards also arise between high-income countries with high regulatory standards and enforcement capacity. It is difficult to avoid the conclusion that in some instances, differences over process standards among developed countries are attributable to regulatory protectionism.

Regulations related to quality cover a wide range of characteristics both of products and how they are produced and handled. Governments intervene by creating public standards for unbranded products, such as identity standards for fish and seafood or quality standards for organic produce. Or a government may take another type of approach by setting disclosure requirements, such as country-of-origin labeling. Still other measures support the creation of brand identity through geographical indications (GIs) that may have reputational connotations for consumers and thus are of value to firms in specific localities. Governments can also remedy informational failures related to branded products. Examples include setting identity standards for processed foods to prevent consumer deception, or requiring nutritional labeling so that consumers have information that private firms do not have an incentive to disclose.

Of these various regulatory measures that governments might adopt, some can be readily verified through product testing. But the proliferation of demands for government regulators to distinguish among products based on process attributes that are unrelated to detectable product characteristics is one of the critical new challenges in food regulation. Regulation of trade in biotech (GM) products based on their production process is perhaps the paramount controversy, but process attribute regulation is also essential to such emerging consumer-driven demands as organic certification and protection of animal welfare.

3. Effects of regulation on trade

Ten years ago it was difficult to find published articles that combined such phrases as "sanitary and phytosanitary measures" and "cost–benefit analysis." The body of literature that has emerged since then, including presentations of new papers at sessions of the 2006 IAAE conference, reflects the importance of food regulation issues since the WTO was created. This literature has several main strands. A set of partial equilibrium simulation studies have been completed that measure the price, trade, and welfare impacts of specific existing regulations and their potential modification. A few studies have evaluated trade-related agricultural and food regulation options within general equilibrium country models (e.g., Perry et al., 2003). Other studies of specific barriers have utilized gravity models to provide econometric estimates of the impacts of regulatory decisions (Wilson [2006] reviews one set of these studies). Complementing these academic papers are the economic assessments provided in the context of national regulatory decision-making processes and the adjudication of disputes in the WTO. From all of this, a rich body of evidence has developed highlighting the costs and benefits of specific measures.

A body of literature has also emerged that investigates the aggregate effects of regulatory measures. Initial efforts were simple tabulations of perceptions of barriers potentially subject to challenge. Roberts and DeRemer's (1997) systematic survey of these perceptions through field offices of the USDA Foreign Agricultural Service found that one tenth ($5.7 billion) of U.S. agricultural exports faced questionable technical barriers affecting market access, expansion, or retention. This study provided a template that has been replicated elsewhere. It has been institutionalized in several countries into annual reports tabulating technical trade disputes from unilateral national perspectives. Within the WTO, the SPS and TBT committees have become forums for discussion of such disputes, as discussed further later.

More recently, efforts have been made to quantify the aggregate effects of technical regulations and various other nontariff trade barriers (NTBs). These analyses estimate the effects of the barriers on traded quantities of agricultural and food products or the gap between domestic and world market prices. The latter approach is familiar from past assessments of Producer Support Estimates (PSEs) by the OECD and others, in which market support has been measured deterministically by calculating such a price gap at the farmgate level, after making adjustments for domestic and international transportation and marketing costs, processing costs, and product quality differences.

The recent empirical analyses of aggregate effects of NTBs take a nondeterministic approach. They utilize multiproduct gravity models to provide econometric estimates of the effects of regulations on trade quantities and price gaps while controlling for other determinants. Four papers presented at the May 2006 workshop on Food Regulation and Trade organized by the International Agricultural Trade Research Consortium (IATRC) are illustrative. Dean et al. (2006) assess the effects of NTBs on price gaps for 47 agricultural products among 67 developed and developing countries. They find that NTBs raise retail prices of fruits/vegetables and meats as much as 141% and 93%, respectively, when they control for endogeneity of the incidence of the trade-restrictive measures. Olper and Raimondi (2006) evaluate border effects (i.e., the extent to which trade across a border is less than trade within borders) on food products among the Quad countries (EU, US, Canada, and Japan). They find that NTB effects (measured by their tariff equivalence) are generally larger than tariff effects, and again are larger when they account for endogeneity of the trade restrictions.

In the third IATRC conference paper, de Frahan and Vancauteren (2006) find that harmonization has increased intra-EU imports for 10 categories of agricultural and food products between 1990 and 2001. Utilizing their quantity estimates and category-specific elasticities of substitution between the domestic and imported goods estimated from an earlier study, they derive tariff equivalents of not harmonizing that range from low (about 10%) for meat and dairy to very high (above 200%) for fruits/vegetables. Finally, Moenius (2006) estimates the effects on 471 four-digit SITC industries of standards set by importers, exporters, and shared by the trade partners. He finds that importer standards provide protection against foreign products, exporter standards increase their foreign market access, and shared standards (that result in lower transaction costs but also reduce product variety) have a net negative effect on trade. This emerging body of econometric analysis reinforces the perception that technical barriers have a substantial influence on agricultural trade, but is still in its infancy and fraught with measurement, endogeneity, and other econometric difficulties.

A third focus of empirical analysis has been on the effects of technical barriers on the export opportunities of developing countries. Two themes have arisen. The first theme is that high standards, especially unjustifiably high standards, discriminate against developing countries, and particularly against poor farmers in these countries for two reasons: because they are difficult for exporters to meet and because the developing countries lack the resources to participate actively in the standard-setting process through either bilateral or multilateral mechanisms. The second theme is that the increasingly differentiated markets for agricultural and food products in developed and middle-income countries open opportunities for poor countries. Both themes have some merit. Specific cases consistent with each have been identified (e.g., Australian Centre for International Agricultural Research [ACIAR], 2005; Mehta and George, 2005; World Bank, 2005) and net assessment of the effects is still ongoing. The first theme puts an onus of responsibility on developed countries and their regulatory decisions. The latter theme highlights the important role of multinational

supply chains and private sector investment, placing more emphasis on investment climate determinants and other public sector decisions of the developing countries.

By way of an illustration of several of these points, consider the long dispute between the United States and Mexico concerning importation of Hass avocados. Over the 15-year period 1991–2006, a complete trade ban has been replaced by U.S. imports from approved orchards in the state of Michoacan under a systems approach of risk management for fruit flies and avocado-specific pests. We have argued (Roberts and Orden, 1996; Orden and Peterson, 2007) that science (evidence of limited risk), opportunity (substantially higher prices in the U.S. market), traceability (of every box to an approved orchard), persistence (of the Mexican exporting association), and joint political will (first under the NAFTA umbrella and later related to discussions of cross-border openness after discovery of a U.S. case of BSE) has each been a necessary condition for progress in opening of the U.S. avocado market.

A recent paper (Peterson and Orden, 2006) simulates the trade and welfare implications of the 2004 decision to open the entire U.S. market to imports year round, and considers further regulatory options. This study takes into account the systems approach compliance costs in Mexico, USDA's estimates of pest risks, and the costs of control for trade-related pest outbreaks within the United States. A synopsis of the results is presented in Table 1. The first column gives the benchmark data for the period October 2001–2003, when Mexico's market access was limited geographically (31 states and the District of Columbia) and seasonally (six winter months only). Column 2 gives the simulation

Table 1
Market equilibrium and welfare effects under alternative regulation of U.S. imports of Mexican Hass avocados

	Base values	Unlimited seasonal and geographic access with compliance measures	Unlimited access without fruit fly compliance measures	Unlimited access without compliance measures for fruit flies and avocado pests	
				Average risk	High risk
Producer prices			Dollars per pound		
Season 1 (winter)					
California	0.871	0.587	0.584	0.577	0.624
Chile	0.577	0.400	0.398	0.390	0.396
Mexico	0.540	0.508	0.502	0.470	0.469
Season 2 (summer)					
California	1.101	0.748	0.746	0.743	0.799
Chile	0.599	0.478	0.476	0.471	0.485
Mexico	0.540	0.537	0.532	0.505	0.510
Mexican compliance costs	0.107	0.056	0.045	0.000	0.000
Quantities (annual totals)			Million pounds		
California	346.011	306.943	306.606	303.433	290.008
Chile	176.813	146.621	146.257	145.000	146.680
Mexico	58.247	206.956	209.678	221.688	226.785
Pest-related costs			Million dollars		
Mexican compliance	6.267	11.644	9.414	0.000	0.000
U.S. expected control	0.000	0.020	0.021	3.091	25.257
Welfare effects			Million dollars		
Producer surplus					
California		−107.651	−108.483	−112.851	−119.989
Chile		−25.069	−25.341	−26.268	−24.959
Mexico		3.108	3.198	3.607	3.788
U.S. equivalent variation		179.443	182.029	193.308	175.675
Net U.S. welfare		71.791	73.547	80.442	55.562

Notes: Synopsis of analysis from Peterson and Orden (2006). Mexican compliance costs reported above include those incurred by producers and exporters. The U.S. expected pest control costs reported exclude small expenditures for fruit fly control by producers of crops other than avocados; net U.S. welfare differs from U.S. equivalent variation plus change in U.S. producer surplus by this expenditure.

results for the 2004 rule under the average pest risks estimated by USDA with the systems approach in place. Mexican exports more than triple, U.S. consumers are beneficiaries, and there is little pest risk to U.S. producers. Total Mexican compliance costs rise but the compliance cost per pound of exports drops by nearly half with the larger trade volume.

Column 3 gives results if the risk management measures related to fruit flies are eliminated in Mexico. This yields a small additional increase in trade volume and U.S. welfare with lower Mexican compliance costs. Finally, columns 4 and 5 show the effects of removing all of the systems approach risk management measures under USDA's average and high estimated risk probabilities in the absence of such measures. There are additional net U.S. welfare gains under average pest risks, but U.S. producers incur substantial pest-related costs. With the high estimated pest risks, expected pest control costs to U.S. producers rise to $25.3 million and net U.S. welfare is reduced compared to the 2004 rule. From these results, one can applaud the opening of the U.S. market in 2004, might argue for reconsideration of some components of the remaining requirements for pest risk management, and must be cautious about full elimination of the systems approach. Mexican producers and exporters credit improvements in their production and processing systems and emergence of a more cohesive industry to their need to comply with the U.S. requirements.

4. Role of the WTO in the food regulatory framework

National governments have paramount responsibility for food regulation, but the WTO has an important role in both enforcement of disciplines on national regulatory decisions and achieving international coordination of regulations and standards. The SPS and TBT agreements, supported by the technical expertise of the international standards organizations, offer the fundamental disciplines, which are backed up by recourse to the WTO's dispute settlement procedures. Other agreements—including the TRIPS agreement, the GATT, and some multilateral environmental agreements—also play a role in defining the latitude and limits to regulation within the food sector.

The SPS agreement contains principles to guide regulation, including transparency, science-based risk management, harmonization, equivalence, and regionalization. The TBT agreement likewise encourages transparency and coordination of national regulations and standards through adoption of international norms. The WTO has had some success in each of the areas covered by these agreements, yet application of the basic principles has not progressed as far as it might have, and improvements can still be made.

The WTO has been successful in promoting symmetry of information about regulations and standards among its members through its notification process under the terms of the SPS and TBT agreements. Notification of new or modified measures has given firms a chance to change production methods to meet new import requirements. Notification also has provided WTO members with the opportunity to question, propose modification, or challenge new or existing measures in the committees that implement the two agreements. This increased regulatory transparency has led to far greater scrutiny of measures than occurred under the GATT.

Over the first 10 years of operation of the SPS agreement, WTO members submitted more than 5,350 SPS notifications. WTO members have taken advantage of this notification process, registering 330 complaints (or counter notifications) in the SPS Committee between 1995 and 2004 (Table 2).[2] These complaints provide some evidence of the extent to which new regulations have created barriers to trade. Developed countries were most often the source (58%) as well as the target (57%) of counter notifications that identified regulations as unjustified trade impediments. The number of counter notifications submitted by developed countries about the measures of other developed countries demonstrates that access to the same scientific information and technologies leaves ample scope for disagreement over SPS regulations. Developing countries have filed fewer counter notifications against

[2] Other WTO committees have formally adopted the term "counter notifications" to reference complaints recorded in the minutes or reports of committee meetings. The SPS Committee has not done so. Complaints are variously recorded under "information from members," "specific trade concerns," and "other business" in the committee minutes. The term *counter notification* is used here to help distinguish the complaints raised in the SPS Committee from the complaints that proceed to formal dispute settlement in the WTO. TBT counter notifications are more difficult to tabulate and we have not updated the results reported in Josling et al. (2004).

Table 2
Complaints (counter notifications) in the SPS committee against trade partners, 1995–2004*

Respondents	Complaints by developed countries				Complaints by developing countries				
	Human health	Plant and animal health	Other**	Subtotal	Human health	Plant and animal health	Other	Subtotal	Total
Developed country	56	30	4	90	57	32	9	98	188
Developing country	44	44	6	94	10	27	2	39	133
Multiple countries	2	4		6	–	3	–	3	9
Total complaints	102	77	17	190	67	62	11	140	330

*Entries exclude "repeat interventions" made by WTO members who registered complaints against the same measure more than once.
**Includes complaints related to horizontal regulations with multiple objectives (e.g., the regulation of genetically modified products); administrative requirements; or regulations with unknown objectives.
Source: Roberts and Unnevehr (2005).

other developing countries than against developed countries.

An examination of the counter notifications related to human health measures by commodity and hazard provides some insight into the sources of tensions over regulations in international agricultural and food markets (Table 3). Most notable are the number of counter notifications related to the regulation of transmissible spongiform encephalopathies (TSEs), which include BSE. The TSE measures alone accounted for 74 of the counter notifications related to food safety regulations between 1995 and 2004, indicating the significant disruption to international trade caused by the BSE outbreaks in Europe and North America over the past 10 years. This impact is related to the fact that cattle, the source of BSE, provide so many food and industrial products, including meat and milk for human consumption, gelatin for pharmaceutical purposes, semen for breeding, and other byproducts used in cosmetics, commercial animal feed, and elsewhere. The EU and Switzerland together accounted for 30 of the TSE counter notifications, which were often directed at the initial emergency measures adopted by countries in 1996. The EU and individual member states later became the target of 23 complaints following implementation of their new, extensive BSE regulations. Examples include Chile and Peru's complaints against the EU's ban on the use of fish meal in ruminant feed,

Table 3
Distribution of complaints (counter notifications) in the SPS committee related to human health measures, 1995–2004*

Commodity	Complaints against measures regulating							
	TSEs**	Food additives	Foodborne pathogens	Toxins and heavy metals	Veterinary residues	Pesticide residues	Other***	Total
Multiple animal products	67		1	8	1		1	78
Meat, poultry, and fish	5		10	3	3			21
Multiple agricultural products		3		14		7	12	36
Dairy and eggs	–	–	6	1	–	–	2	9
Processed products				8		4	3	15
Feedstuffs	2			1	2			5
Horticultural products	–	1	1	–	–	1	–	3
Cereals	–		–	2	–	–	–	2
Total	74	4	18	37	6	12	18	169

*Entries exclude "repeat interventions" made by WTO members who registered complaints against the same measure more than once.
**Transmissable spongiform encephalopathies (TSEs) include bovine spongiform encephalopathy (BSE).
***Includes complaints related to horizontal regulations with multiple objectives (e.g., the regulation of genetically modified products); administrative requirements; or regulations with unknown objectives.
Source: Roberts and Unnevehr (2005).

and Australia's complaint against EU restrictions on selected cosmetics. More recently, China and Argentina have raised objections to U.S. measures, adopted following the identification of a BSE case in Washington State in 2003, which prohibited the use of selected cattle by-products in food, dietary supplements, and cosmetics and imposed new record-keeping requirements on all exporters, regardless of BSE status (WTO, 2005).

The obligation under the SPS agreement to base measures on scientific risk assessment has been crucial to reducing the disingenuous use of SPS regulations and to promoting convergence of SPS measures among countries. The impact of the risk management requirements of the SPS agreement has extended beyond WTO complaints and dispute settlement decisions to spur broad-based regulatory reviews by countries to determine whether they and their trading partners are complying with the obligation to base decisions on scientific risk assessments. In many cases, there is evidence that regulatory authorities are either unilaterally modifying regulations or voluntarily modifying regulations after technical exchanges. However, it is evident that some gaps remain in convergence around the principle of using science as a basis for regulation. In some circumstances, countries' reliance on the precautionary principle to guide risk management decisions has led to high-profile trade disputes, as in the hormones and GM food cases. In others, regulatory decisions impose large economic costs to achieve very minimal risk reduction. Such decisions are likely to be controversial.

The WTO's promotion of harmonization has been less successful than its attempts to increase transparency or require that measures be based on a risk assessment. The impact of harmonization on trade appears to have been constrained as much by the lack of international standards as by normative considerations since the SPS agreement came into force. The majority of early notifications (1995–1999) from WTO members stated that no international standard existed for the notified measure. Because international standards are a global public good, it is not surprising that national authorities have underinvested in such measures. Not only are there too few international standards in the food area, but too many of the current international standards are outmoded, contributing to the low adoption rate for those standards that do exist.

Equivalence is an alternative to harmonization. The SPS and TBT agreements require WTO members to allow imports from countries that have measures equivalent to their own. This provision endorses regulatory flexibility, which allows countries to allocate scarce resources efficiently rather than identically. Despite the conceptual appeal of equivalence, its use is constrained by various factors, both operational and political. The administrative burden of equivalence determinations is often significant even among countries with similar levels of capacity. Moreover, recognizing the equivalence of an alternative regulatory regime may require national regulators to offer the same alternative to domestic producers, requiring in turn new or revised domestic regulations before foreign producers can gain access to the market. Some progress has been made, but experience so far suggests that negotiating equivalence agreements is difficult and their use is not common. To encourage reporting of equivalence protocols, the WTO adopted specific notification procedures in 2001. However, since that time, no country has officially notified an equivalence arrangement to the SPS Committee.

Regionalization under the SPS agreement has also met so far with only limited success, and the successful cases have depended heavily on the efforts of the exporting countries. Argentina's numerous setbacks in its efforts to eradicate FMD underscores the fact that investments in public sector regulatory infrastructure are needed as an incentive to private sector eradication efforts and thus establishment of the pre-conditions for regionalization. But it is also evident that national regulation will not always work. Transborder pest or disease controls may be required where there are insufficient natural barriers or when animals (including wildlife) move freely across borders.

To summarize, the WTO agreements and committee procedures, together with the reviews that WTO rules have encouraged at national, bilateral, and regional levels, have provided useful channels through which countries can strengthen the framework for global food regulation. They may also challenge policies of their trade partners through these channels when they have doubts about whether regulations conform to international rules as they apply to food trade. The institutional innovations that emerged from the Uruguay Round have given the WTO an increased role in shaping regulation in the global food system. But the reach of the WTO disciplines and principles has been somewhat limited. National governments remain reluctant to cede

too much authority over agricultural and food safety and quality to international decision making.

5. WTO dispute resolution

The compliance of countries with the WTO agreements is reinforced by the organization's formal dispute settlement procedures. Only a few conflicts over food regulations have led to the establishment of dispute panels, but these few cases have played a critical role in defining the scope of WTO rules and obligations.

Of 41 formal requests for consultations about food regulations during 1995 to 2006, only 14 (related to 10 distinct cases) have advanced to dispute settlement proceedings (Table 4). There have been rulings by WTO panels in 8 of the 10 cases through 2006. The panels' findings in six cases were referred to the Appellate Body.

In the disputes related to the SPS Agreement heard by the Appellate Body—hormones, salmon, varietal

Table 4
Disputes over regulation of safety and quality of agricultural products advancing to WTO panels and appellate body, 1995–2006

Dispute settlement number	Petitioners(s)	Respondent	Issue	Agreement(s) referenced in dispute proceedings	Status
1995					
DS 18	Canada	Australia	Measures affecting importation of salmon	SPS, GATT	Panel and AB ruled against Australia
1996					
DS 26/48	United States/Canada	EC	Measures affecting meat and meat products (hormones)	SPS, TBT, GATT, AoA	Panel and AB ruled against EC; panel established in 2005 (DS320/321) to review U.S. and Canadian retaliatory tariffs
DS 58	India, Malaysia, Pakistan, Thailand	U.S.	Import prohibition on certain shrimp and shrimp products	GATT	Panel and AB ruled against the United States
1997					
DS 76	United States	Japan	Measures affecting agricultural products (varietal testing requirements)	SPS, GATT, AoA	Panel and AB ruled against Japan
1999					
DS 174/290	United States/ Australia	EC	Protection of trademarks and GIs for agricultural products and foodstuffs	TRIPS, GATT, TBT, WTO Agreement	Panel ruled against EC
2001					
DS 231	Peru	EC	Trade description of sardines	GATT, TBT	Panel and AB ruled against EC
2002					
DS 245	United States	Japan	Measures affecting the importation of apples	SPS, GATT, AoA	Panel and AB ruled against Japan
DS 270	Philippines	Australia	Importation of fruits and vegetables	GATT, SPS, Import Licensing	Panel established in 2003; report not yet circulated
2003					
DS 287	EC	Australia	Quarantine regime for imports	SPS	Panel established in 2003; report not yet circulated
DS 291/ 292/293	United States/ Canada/ Argentina	EC	Measures affecting the approval and marketing of biotech products	SPS, GATT, AoA, TBT	Panel ruled against EC

Source: WTO (2006a).

testing, and apples—developed countries challenged the regulations of other developed countries, and in each case the panel and Appellate Body concurred that the regulation in question violated the requirement that it be based on a valid risk assessment. These outcomes demonstrate the importance accorded to the principle of science-based risk management in the SPS agreement and show that even the measures of countries with advanced scientific establishments are not immune to challenge.

The outcome in the hormones case demonstrates further that the WTO Appellate Body can rule against measures based on popular consumer misconceptions of risks, as well as more overtly discriminatory measures. The WTO rejected the EU's use of the precautionary principle in its legal defense, because no explicit reference to this principle appears in the SPS agreement. Article 5.7 of the agreement recognizes a conditional precautionary principle, which allows countries to provisionally adopt measures on the basis of "available pertinent information" while seeking additional information "necessary for a more objective assessment of risk." However, the EU could not defend its permanent ban by reference to this provision. This result removes a degree of national political sovereignty for regulations in cases in which evidence has not been marshaled to demonstrate any risk from trade. But the formal ruling has not resolved this dispute.[3]

The WTO dispute over EU measures regulating biotech products raised many of the same legal issues as the hormones case. Argentina, Canada, and the United States argued that the EU Commission's failure to complete the process set out in its own directives and regulations for the pre-marketing review of 27 biotech products between October 1998 and August 2003 constituted a *de facto* ban on these products which was not based on a risk assessment (United States, 2004). The complainants also argued that nine specific prohibitions by EU member states on biotech products that had been formally approved by the EU were likewise not based on a risk assessment. The EU argued that there have been no undue delays in its scientific approval processes which "are premised on the application of a prudent and precautionary approach" (European Communities, 2004). The WTO panel issued its report in this highly visible dispute in September 2006, concurring with the complainants that the EU had maintained a *de facto* ban on biotech products that violated its obligations under the SPS Agreement. Specifically, the panel noted that "it is clear that application of a prudent and precautionary approach is, and must be, subject to reasonable limits, lest the precautionary approach swallow the discipline" imposed by the SPS Agreement (WTO, 2006b). The panel likewise agreed with the complainants that the prohibitions maintained by EU member states were not based on a risk assessment.

In the two other cases of food regulation that advanced to rulings by the Appellate Body, developing countries lodged complaints against measures of developed countries. In the sardines case, brought by Peru, the Codex Alimentarius international standard was found to be effective and appropriate to achieve EU objectives of transparency, consumer protection, and fair competition. The importance of this case lies in demonstrating that international standards can take precedence over national regulatory decisions and can set bounds on the use of policies that, in effect, limit imports. In the second case, India, Malaysia, Pakistan, and Thailand challenged U.S. restrictions on importation of shrimp when countries failed to use turtle-excluder devices. The case established the precedent that process standards can be mandated in regulations to achieve an environmental goal. This precedent provides a small but significant exception to the product–process doctrine, which deems any regulation affecting trade based on how a product is produced to be out of compliance with the WTO rules. In the shrimp/turtle case, the WTO Appellate Body concluded instead that the objective of the U.S. law was legitimate under GATT Article XX and, ultimately, that U.S. implementation of its policy

[3] In 1999, the WTO authorized the United States and Canada to increase tariffs on $128 million of EU exports when the European Union failed to bring its measures into compliance with the SPS agreement following the Appellate Body ruling. Four years later, the EU notified the WTO that it had met its obligations under the SPS agreement with the adoption of Directive 2003/74/EC which left the ban in place but cited new studies to justify its measures. The United States and Canada disagreed with the EU's claim that the new Directive was based on science and that it reflected the WTO's recommendations and rulings, and left their retaliatory tariffs in place. In January, 2005, the EU requested that the legality of these tariffs be reviewed by a WTO panel under the terms of the Dispute Settlement Understanding (WTO, 2005). The panel expects to complete its final report to the parties in late 2006.

was justified because of its serious and ongoing efforts to minimize negative trade effects.

The greatest difficulties for WTO dispute resolution arise in cases such as beef hormones or biotechnology in which strongly held differences of views among countries have not been reconciled by other means. That the most contentious of these cases have involved issues of risk again demonstrates the practical limits of science in securing regulatory convergence. Unfortunately, too much reliance on the WTO's dispute resolution process to address these disagreements will create problems for the acceptance of its rulings, as may soon become evident for decisions related to biotech foods. When rulings for the complainant in such difficult cases lead to retaliatory tariffs because the respondent fails to change its policy or offer acceptable compensation, the trade system suffers, even if the validity of WTO procedures is upheld.

Overall, our review of technical trade barriers related to agricultural and food safety and quality suggests a trichotomy of cases. For a few dominant cases the economic stakes are high or issues of regulatory principles have been elevated to a high level of contestation. These cases include several involving consumer preferences and related political economy, such as beef hormones and biotech products. On these issues there have been WTO disputes in which appeals to science have proven insufficient to achieve a resolution.

The high-profile cases also include BSE, FMD, and, recently, avian influenza (Moore and Morgan, 2006). These cases have resulted in some restrictive trade regulations that have been challenged in bilateral deliberations and informal WTO committee discussions, but not in formal WTO disputes. The international standards organizations have offered some constructive evaluations in these cases. Yet, the reach of international disciplines is limited. For example, the OIE established that some traded products were not vectors for disease transmission after the announcement of a likely BSE link to human variant Creutzfeldt–Jakob disease disrupted world trade in beef and bovine products in 1996. This allowed certain initial prohibitions to be eased. Yet 9 years later, despite extensive IIE efforts and with BSE much better understood, Canada and the United States faced (and themselves imposed against others), costly embargos on meat trade without corresponding internal quarantines when single domestic incidences of BSE were discovered. The regulation of agricultural and food safety across versus within borders is often not as consistent as might be hoped, despite the disciplines attempted through the WTO.

Finally, there is widespread interest in many diverse food regulations affecting trade expressed among industry and consumer groups. A number of disagreements about trade are finding resolution. But the number of formal disputes, or even counter notifications, is relatively small. The current regime tolerates a large number of technical regulations without challenge.

6. Improving food regulation

Food regulation is likely to expand over the coming years in tandem with increased use of private standards, and the number of international disputes is likely to increase correspondingly. So far, the disciplinary mechanisms in place through the WTO—the negotiated agreements, implementation discussions and informal conflict resolution through the committees, and formal dispute resolution—have proven useful. There is no doubt at this point that the WTO rules remain necessary. Disingenuous use of regulatory measures is still evident in agricultural markets and these abuses need to be reined in. Contrary to the predictions of some consumer and environmental advocates, the WTO disciplines have not resulted in the "downward harmonization" of regulations. No credible evidence has emerged to indicate that WTO rules have prevented countries from achieving legitimate regulatory objectives, even when very trade-restrictive measures have been adopted.

The current global regulatory framework, in deference to national sovereignty, allows countries to adopt various measures for which global or even national costs outweigh their national benefits. Thus, there is scope for enhancing the efficiency and fairness of the global food system. The basic challenges, of achieving balance between harmonization and diversity and between political support and political capture, must be faced within the existing institutions.

Economic assessment of regulations is still an underdeveloped element of the food regulatory framework. The provisions of the SPS and TBT agreements provide only limited guidance on which measures are desirable to adopt. It remains a challenge for national regulators to build on the legal criteria of the SPS and TBT agreements to undertake the benefit-cost analysis that would give a more defensible basis for import protocols.

Toward this end, developed countries should adopt an "agreements plus" approach to both risk-reducing and quality regulations by balancing the benefits of regulation against all costs, including the costs of forgone trade. A change from the narrow risk-analysis perspective to the benefit-cost perspective for SPS measures would be a constructive move toward a desirable opening up of markets and would reduce the scope for trade disputes. Plant, animal, and human health and safety would not be sacrificed for trade, but trade would be taken into account as an integral part of the commercial environment that regulations affect. Countries should view trade as an activity that provides them with an expanded range of safe agricultural and food products at lowest cost, and regulations as a necessary way of ensuring the safety of food regardless of where it is produced.

Recognition of the benefits of imports also provides a rationalization for public investment in monitoring and inspection services at a time when the pressures to downsize public agencies are strong. It is not in the interests of importing or exporting countries to reduce the effectiveness of inspection services. This is all the more true since the September 2001 terrorist attacks in the United States—countries must now guard against biosecurity threats, but without creating prejudice against legitimate trade. The U.S. Bioterrorism Act (BTA) of December 2003, for example, was notified to the WTO under the SPS agreement. The U.S. Food and Drug Administration (FDA) estimated that 16% of firms exporting to the United States might cease doing so because of the tightened security measures for the agricultural and food products it covers, particularly smaller firms for which the new rules might be relatively most costly. Preliminary evidence comparing exports to the United States in 2003 and 2004 shows smaller firms more likely to have stopped or decreased volumes, perhaps due to the BTA (Wieck, 2006). The BTA has also been the subject of several WTO counter notifications by developed and developing countries due to the administrative requirements it imposes. Enhanced border security will have to be supported by increased public resources to minimize adverse effects on trade of such measures.

It also must be recognized that process standards are here to stay. HAACP is now well established and the regulation of some quality attributes of foods, such as organic, turtle-safe, or free-range, will always require process standards. Greater reliance on process standards places more responsibility on the regulatory infrastructure of the exporting country than on border inspection in the importing country. This trend in quality regulation is leading to increased use of private, third-party certification services in the food sector, especially within countries lacking satisfactory public certification infrastructure. These and other alternative certification options should be but one manifestation of a broader commitment by national food quality regulators to open and contestable markets that genuinely serve consumer interests.

We have noted the political-economy dimensions of food regulatory decisions and disputes in several ways. In closing, we note the broader political economy of agricultural support and protection policies in which food regulation is embedded. The high levels of tariff protection and domestic subsidies provided to agriculture by many countries taint the context in which food regulation decisions are made. Exporters are skeptical of new measures that add to the barriers their products face. Market signals in the developed countries are distorted by those countries' high levels of agricultural producer support and protection, which affects food regulatory decisions, particularly related to the adoption of cost-reducing and output-enhancing new technologies. The distortionary effects of agricultural support and protection policies on regulatory decisions are arguably just as significant an impediment to the efficiency of the world food system and to harmonious trade relations as the better-recognized direct effects of these policies. Lessening of these interventions, while it might risk inducing additional regulation as a substitute, would also provide more latitude for regulatory decisions to be considered on their merit.

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